

AMENDMENT

Serial Number: 10/776,472

Filing Date: February 11, 2004

Title: Highly Active Liquid Melts Used to Form Coatings

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NANO004**REMARKS**

The Official Action mailed January 12, 2011 has been carefully considered. Reconsideration and allowance of the subject application, as amended, are respectfully requested.

Status of the Claims and Claim Amendments

Claims 1-5, 6, 7 and 12 are pending in the present application. Claims 1-5 are withdrawn and claims 6, 7 and 12 stand rejected.

Independent claim 6 has been amended to recite wherein said alloy consists of iron in the range of 60.1 wt% to 68 wt%, manganese, chromium, molybdenum in the range of 1.5 wt% to 6.4 wt%, tungsten, boron, carbon and silicon wherein the elements are combined and present at a total of 100 wt%. Furthermore, independent claim 6 has been amended to recite that the ATSM C633 bond strength is of at least 5501 psi. Support for this amendment may be found in the experimental examples set forth in paragraphs [0018] through [0020] as well as in Table 1. In particular, paragraph [0018] provides two experimental samples which rely only upon the presence of the above elements, and which support the range of Fe and Mo now recited, and wherein the weight percent of the elements adds up to 100%. No new matter has been added by this amendment.

Pursuant to MPEP § 2111.03 when the phrase consists of appears in a clause of the body of the claim, it properly limits the element set forth in the clause. For the reasons noted below, it is respectfully submitted such limitation presented herein for consideration defines over the art of record.

Claim 12 has been cancelled herein.

Claim Rejections

Claims 6-7 and 12 stand rejected under 35 USC §103(a) as being unpatentable over Dorfman, U.S. Patent No. 4,822,415 (herein after "Dorfman") in further view of Kim, et al., U.S. Patent No. 5,643,531 (herein after "Kim").

As noted above, independent claim 6 has been amended to recite that the alloy consists of iron in the range of 60.1 wt% to 68 wt%, manganese, chromium, molybdenum in the range of 1.5

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wt% to 6.4 wt%, tungsten, boron, carbon and silicon wherein the elements are combined and present at a total of 100 wt%

Dorfman in view of Kim fail to teach or otherwise render obvious the above recited claim language. Specifically Dorfman is directed to “an iron alloy composition containing molybdenum, copper and boron, characterized by improved wear and corrosion resistance.” Col. 1, lines 6-8. In the exemplary alloy compositions described in Col. 3, lines 1 through 66, copper is taught as being always present and required. Furthermore, in example 4 it is demonstrated that alloy 6, which did not include copper, exhibited overall poor corrosion results. See Exhibit 4 as well as Tables I, II.

Dorfman also teaches that in a broad aspect, molybdenum is at least 10 % if the boron is at least 2 %. Dorfman, Col. 3, lines 1-10 and Col. 3, lines 20-28 (“the molybdenum being at least 10% if the boron is greater than 2%”). In addition, in the compositions set forth in example 4 of Dorfman, alloys 7 and 8 include less than 10 wt % Mo and 4.0 wt % B. See Table I. However, it was found that alloy 7 was porous, brittle with poor abrasive wear, and alloy 8 exhibited a poor coefficient of friction and was dense and abrasive. See Table II.

The alloys now claimed in amended independent claim 6 do not include copper or allow for the presence of copper (see again, the “consists of” language noted above) and also recite a level of Mo that is well-outside the teachings of Dorfman.

Kim is directed to a “ferrous alloy composition and manufacture and coating methods of mechanical products using the ferrous alloy in order to improve war, corrosion and heat resistances of the mechanical products which are exposed to friction and wear environments with or without lubricating condition.” Col. 1, lines 7-12. While Kim teaches an iron based alloy that does not incorporate copper as set forth in Dorfman, Kim does not teach the incorporation of tungsten in the alloys disclosed therein. Kim discloses at Col. 2, lines 53-63 that WC wear resistant second phase materials can be added when necessary. However, Kim does not disclose that tungsten is incorporated into the iron based metallic coating alloy that is melted to a liquid state. See independent claim 6. Furthermore, the amount of WC phases that may be added is not recited. Accordingly, Kim does not teach or render obvious the subject matter of now amended independent claim 6.

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Having dealt with all the objections raised by the Examiner, it is respectfully submitted that the present application, as amended, defines over the art of record under 35 USC § 102 and/or 103. Reconsideration and reexamination is requested.

If the Examiner desires personal contact for further disposition of this case, the Examiner is invited to call the undersigned Attorney at 603.668.6560.

In the event there are any fees due, please charge them to our Deposit Account No. 50-2121.

Respectfully submitted,

Date: July 12, 2011

By: /Steven J. Grossman /
Steven J. Grossman, Ph.D.
Reg. No. 35,001

Grossman, Tucker, Perreault & Pflieger, PLLC
55 South Commercial Street
Manchester, NH 03101